

In the context of the profound environmental, social, and cultural transformations shaping the contemporary world, the relationship between human beings and nature emerges as one of the central challenges in the design of living environments. Forest Therapy addresses this issue by exploring the growing convergence between health, nature, and design disciplines, placing the role of natural ecosystems at the core as a fundamental resource for psychophysical well-being and for interspecific balance among individuals, communities, and the environment. Through an interdisciplinary approach integrating architecture, landscape design, urban planning, representation, and environmental sciences, the volume investigates Forest Therapy as both a theoretical framework and a practical approach grounded in a synergistic relationship with nature, capable of fostering processes of regeneration, ecological awareness, and social cohesion. The collected contributions offer theoretical reflections, methodological approaches, and internationally oriented case studies, highlighting the value of natural environments as active agents in the design of resilient, inclusive, and well-being-oriented spaces. Particular attention is devoted to the experiential and perceptual dimensions of the relationship with the natural environment, examined as essential components of processes of care, prevention, and psychophysical regeneration. The contributions analyze the significance of direct contact with nature and immersive environmental practices as devices capable of strengthening individual awareness, social relationships, and a sense of place and belonging. By framing Forest Therapy within the broader perspective of planetary health, the volume positions itself as a tool for critical and operational reflection aimed at designers, researchers, and policymakers, offering interpretative keys to guide future strategies for the design of living environments from a sustainable, inclusive, and regenerative perspective.

Forest Therapy
The challenge of the future for the design of living environments

Ornella Zerlenga
Valeria Menchetelli,
Alex Gesse

La scuola di Pitagora

The challenge of the future
for the design of living environments

**Temi e frontiere
della conoscenza e del progetto**

**Themes and frontiers
of knowledge and design**

25_2025

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edited by

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**Forest Therapy:
the challenge of the future
for the design of living environments**

La scuola di Pitagora editrice

Copertina: Millo, *Never Give Up*, Santiago, Chile. Aerial view of the large-scale street art intervention portraying a human figure clinging to a cut tree trunk from which a sprout emerges, inserted within a compact and vertically stratified urban context. The mural relies on a deliberate chromatic contrast between the predominantly monochrome architectural fabric and the vivid green of the vegetation, articulating a visual narrative centred on resilience, regeneration, and the persistence of nature within anthropized environments (source: www.millo.biz). Cover graphic design by Riccardo Miele.

The opening images of each contribution were chosen and developed by Margherita Cicala who also curated the graphic design of the entire volume.

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Between leaves and pencils: the art of shinrin-yoku in nature drawing

Cristiana Bartolomei, Caterina Morganti

Abstract

This research explores the role of drawing in communicating the benefits of shinrin-yoku. By analyzing various graphic representations, ranging from spontaneous sketches to complex infographics, it highlights how visual language can effectively convey the psychophysical benefits of immersion in natural environments. The objective is twofold: on the one hand, to understand how drawing can illustrate the mechanisms through which Forest Therapy affects our bodies; on the other hand, to assess its potential in promoting a deeper and more conscious interaction with nature. The results show that drawing is a powerful tool for clearly and immediately communicating the benefits of shinrin-yoku, not only by simplifying complex information but also by activating emotional and cognitive processes involved in well-being. Drawing enhances the understanding of the underlying neurobiological mechanisms and elicits positive emotions, facilitating memory and self-awareness. The analysis of graphic representations underscores the role of drawing in fostering emotional and spiritual connections with nature, promoting a more mindful and respectful approach to the environment. Drawing, in fact, does not merely represent reality but interprets and reworks it in a personal way, inviting the observer to reflect on their relationship with nature. This interdisciplinary approach, which integrates psychology, neurobiology, and visual arts, offers new perspectives on the human-nature relationship. Drawing proves to be a valuable tool for communicating the benefits of shinrin-yoku, encouraging a deeper and more conscious interaction with nature.

Keywords

shinrin-yoku;
forest therapy; human well-being;
graphic representations; natural representations

ON PAGE 100:

Bifido, street artwork. The work depicts the face of a young girl partially concealed by large green leaves and vibrant flowers, creating an evocative composition that intertwines the human figure with natural elements. Artwork and photo by Bifido.

Connecting with Nature-the roots of *Shinrin-yoku* and Drawing:

In the contemporary context, the growing interest in connecting with nature and its health benefits has led to a renewed appreciation of the role of drawing as a tool to facilitate this connection. This interest is reflected in the Japanese practice of *shinrin-yoku*, literally 'forest bathing', which promotes mindful contact with nature to enhance psychophysical well-being (Antonelli et al., 2019). *Shinrin-yoku* has deep roots in Japanese culture, where a profound connection with nature has always been considered essential for physical and mental well-being (Ikei et al., 2017). Since ancient times, the Japanese have engaged in similar activities, visiting forests to meditate, rejuvenate, and restore inner harmony (Alyan et al., 2021). The term '*shinrin-yoku*' was coined in the 1980s by Dr. Tomohide Akiyama, director of the Japanese Agency for Agriculture, Forestry, and Fisheries. Concerned about the rise of stress and chronic diseases in Japanese society (Chiba & Nakayama, 2012) (Matsuoka et al., 2017), Akiyama promoted a connection with nature as a strategy for prevention and healing. Drawing inspiration from ancient Japanese traditions and emerging scientific research, Akiyama codified the principles of *shinrin-yoku*, making it an accessible practice for everyone, without requiring special skills or knowledge.

Shinrin-yoku is based on several key principles:

- Mindfulness: fully immersing oneself in the present, letting go of thoughts and worries, and focusing on the beauty and sounds of nature.
- Sensory openness: engaging all the senses to deeply perceive nature, through sight, hearing, smell, touch, and taste.

- Appreciation: cultivating a sense of gratitude for the beauty and wonder of nature, recognizing its intrinsic value.
- Connection: feeling like an integral part of nature, developing a sense of unity and interconnectedness.

Shinrin-yoku, therefore, is not just a simple walk in the woods, but a deep and mindful immersion in the natural environment, and drawing can help make this experience even more tangible (Li et al., 2009). During the practice, it is important to be guided by one's senses and curiosity, to breathe deeply, absorb the sounds, smells, and freshness of the air, and pay attention to details such as the texture of tree bark and the play of light on leaves (Qiu et al., 2016). Numerous scientific studies have shown that *shinrin-yoku* brings many benefits to physical and mental well-being (Baxter & Cook, 2016): it reduces stress and anxiety, improves mood and happiness, increases concentration and creativity, strengthens the immune system, lowers blood pressure, improves sleep, promotes healing from chronic illnesses, and boosts vitality and energy (Annerstedt et al., 2013).

In a fast-paced and stressful world, *shinrin-yoku* offers an oasis of peace and well-being, an opportunity to reconnect with oneself and with nature, rediscovering harmony and inner balance. In this context, nature drawing proves to be an essential tool, an extension of our connection with nature (Kamitsuka et al., 2016).

Through drawing, we capture the beauty around us not only with our eyes but also with our hands and minds. We transfer onto paper the nuances of light and color, the shapes of trees, and the play of light on leaves. Each stroke becomes a

way to deepen our relationship with nature, to grasp its details and the emotions it evokes in us. Nature drawing, therefore, is not just a mere reproduction of reality, but a personal interpretation, a way to express our connection with the natural world. Through drawing, we give voice to our emotions, our gratitude for the beauty that surrounds us, and our sense of belonging to something greater. In this way, *shinrin-yoku* and nature drawing intertwine in a unique and profound experience. Immersion in nature opens our senses (Fig. 1) and prepares us to perceive its beauty, while drawing allows us to capture it in our memory and internalize it.

Drawing becomes a way to carry the benefits of *shinrin-yoku* with us into everyday life. Every time we look at a drawing made during this practice, we can relive those moments of peace and connection with nature, finding a sense of calm and well-being (Kuo & Faber, 2006). The increasing urbanization of society has led to a growing separation between humanity and the natural world. In this context, drawing offers a means to reestablish a meaningful connection with nature, allowing people to carefully observe their surroundings and represent them through art. This practice not only fosters greater awareness of the environment but also stimulates a deeper curiosity and appreciation for nature. Drawing can play an important role in the conservation and protection of nature. Visual representations of natural ecosystems and animal species can raise public awareness on issues such as biodiversity, pollution, and climate change, encouraging action for environmental protection. Advertising campaigns, posters, and artworks that use drawing as a means of communication often prove



TASTE
The ability to find berries, herbs, and other edible products fosters a stronger connection with the forest environment.

HEARING
The sounds of the wind through the leaves, the flowing water, and the singing birds promote psychophysical relaxation.

SMELL
Forest trees release bioactive volatile organic compounds with anti-inflammatory, antioxidant, relaxing, and anxiolytic properties.

TOUCH
Touching wood, leaves, and all parts of plants has a calming effect, influencing parasympathetic activity.

SIGHT
The natural landscape, the color, and the various shapes of the plants promote psychophysical relaxation by reducing stress levels.

effective in conveying environmental messages and inspiring positive behavioral changes (Fig. 2).

Purpose and scope - how Drawing enhances *Shinrin-yoku*:

This study examines how *shinrin-yoku* and drawing interact to enhance human well-being. Drawing achieves this through:

- Narrative support: drawings can complement and enrich written narratives, making stories more engaging and accessible. For example, an illustrated story following a person during a *shinrin-yoku* session can better clarify the steps and effects of this practice, strengthening and simplifying the conveyed message.
- Emotional representation: images have the power to evoke emotions immediately and strongly. A drawing depicting a relaxed person in a natural setting can instantly communi-

Fig. 1. Shinrin-yoku and the five senses.

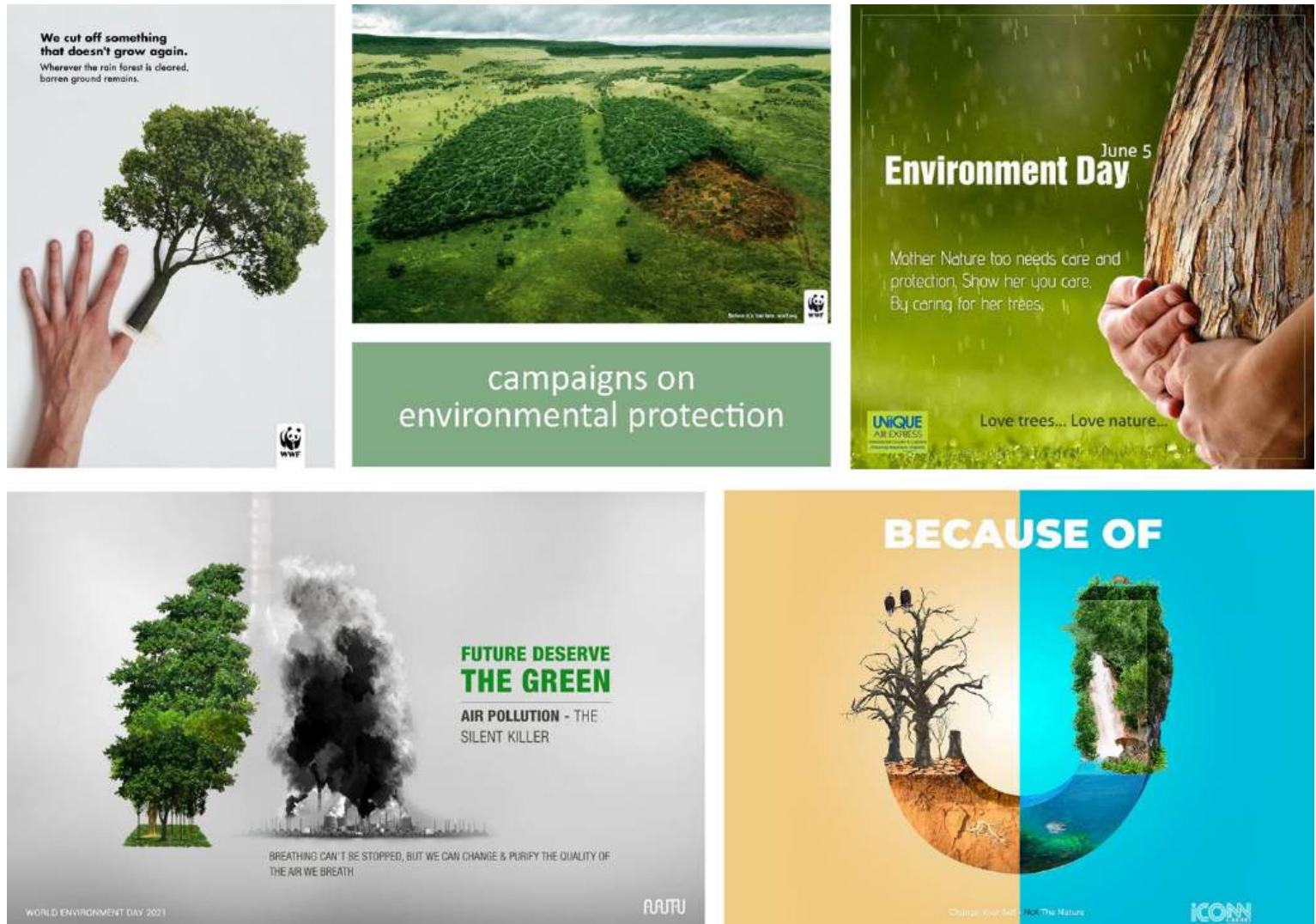


Fig. 2. Examples of advertising campaigns for environmental protection.

cate the sense of well-being and tranquility that *shinrin-yoku* offers, without the need for lengthy explanations.

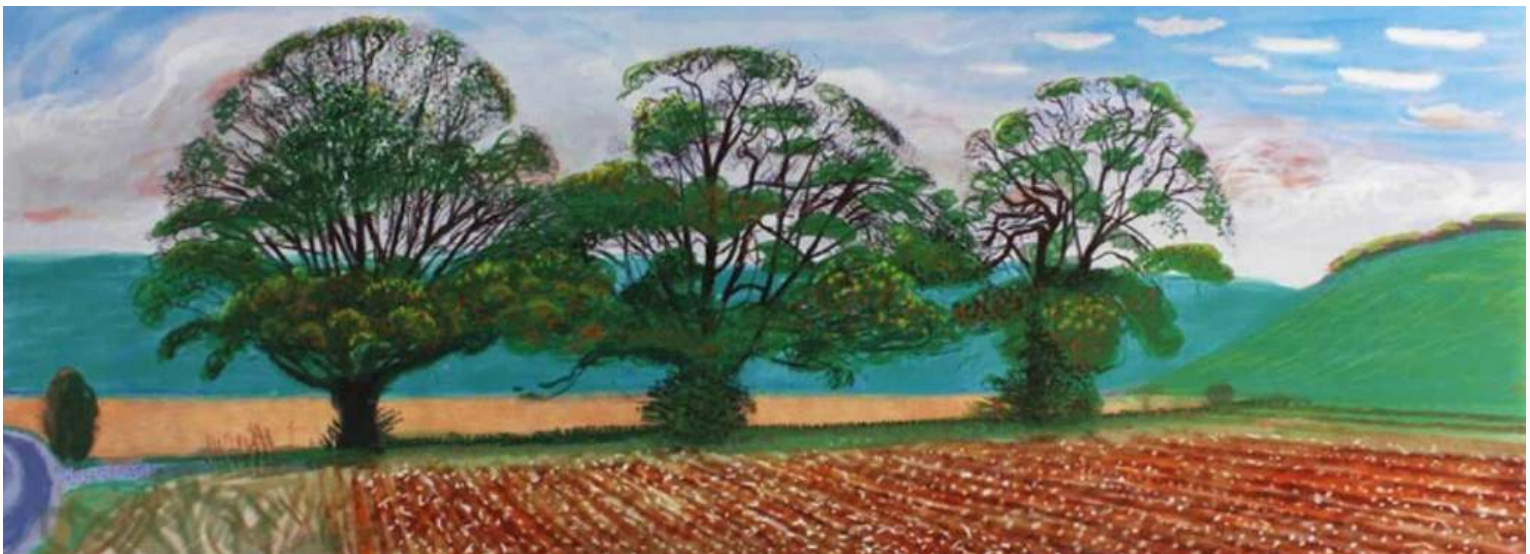
- Accessibility and inclusivity: drawing can overcome linguistic and cultural barriers, making concepts accessible to a wider audience. For example, an infographic showing the physiological benefits of Forest Therapy, such as reduced cortisol levels or increased heart rate variability, can be understood by people of different ages and educational backgrounds.

- Memory facilitation: visual information tends to be more easily remembered than textual information. Drawings and infographics can help cement complex concepts related to nature and human well-being in memory. For instance, a diagram showing the impact of Forest Therapy on various health aspects (such as stress, mood, and the immune system) can serve as an effective educational tool and reminder.
- Immersive experience: through detailed naturalistic illustrations, drawing can create an immersive visual experience that stimulates the imagination and allows people to 'feel' nature even when they are not physically present. This type of representation is particularly useful for those living in urban areas with limited access to green spaces. A concrete example of drawing's effectiveness in communicating complex concepts is the work of artists like David Hockney (Figs. 3-5), who has explored nature through his art, capturing the beauty and tranquility of natural landscapes. His illustrations not only depict nature but also convey the emotion and sense of peace that comes from being immersed in a natural environment. Another example is the infographics created by the World Wildlife Fund (WWF), which use drawings to explain the impacts of deforestation and the benefits of forest conservation (Fig. 6). These visual materials are designed to raise awareness and educate the public about the complex interrelationships between forest ecosystems and human well-being (Hansmann et al., 2010). Drawing proves to be a powerful and versatile tool for communicating the benefits of *shinrin-yoku* and for conveying complex concepts related to nature and human well-being in a clear, immediate, and emotionally engaging way.



Fig. 3. *Arrival of Spring in Woldgate.* By David Hockney. Painted in 2011.

Fig. 4. *Autumn Trees Near Thixendale.* By David Hockney. Painted in 2008.



Methods and evidence-demonstrating the benefits of Forest Immersion and Drawing

The methodology of this study is based on a critical review of existing literature on *shin-rin-yoku*, naturalistic drawing, and their combined effects on human well-being (Hansen, et al., 2017). The selected studies include empirical research, meta-analyses, and interdisciplinary approaches, providing a solid foundation

for exploring how these practices can enhance mental and physical health through a deep connection with nature (Antonelli, et al., 2021). Although scientific evidence on the effects of 'forest therapy' is rapidly growing, the discipline remains relatively young (Kotte et al., 2019). The first international scientific articles on this topic date back to 2006, but it was only from 2015 that scientific output became significant, with a notable increase in publications starting in 2019. In 2021, more than one scientific article per week was published on the topic of 'forest bathing' or 'forest therapy'.

Our work initially reviewed part of the existing literature on the benefits of forest therapy, not necessarily related to drawing, before focusing on how naturalistic drawing can amplify and support the benefits of forest therapy (Park et al., 2010). One of the fundamental studies examined is that conducted by Qing Li, an immunologist (Nippon Medical School-President of the Japanese Society of Forest Medicine) (Li et al., 2007), which highlighted how *shinrin-yoku* can improve natural killer cell activity and the expression of anti-cancer proteins, suggesting significant benefits for the immune system and physical health (Li et al., 2009) (Mao et al., 2016). This study was conducted through field experiments in 24 Japanese forests, providing empirical evidence on the therapeutic properties of forest immersion (Hansen, et al. 2019). Furthermore, the systematic review by Yeon and colleagues (Yeon et al., 2021) examined the effectiveness of *shinrin-yoku* in reducing depression and anxiety, confirming that exposure to natural environments can have positive effects on mental health (Büssing et al., 2020).



Fig. 5. Felled Trees. By David Hockney. Painted in 2008.

This study, published in the *International Journal of Environmental Research and Public Health*, used meta-analytic analysis to consolidate evidence on the psychological impact of forest bathing. Regarding naturalistic drawing, research by Berman et al. (Berman et al., 2008) documented the cognitive benefits of interacting with nature, demonstrating how exposure to natural environments, even in their images, can improve cognitive functions and reduce

stress. This study was published in *Psychological Science*, highlighting the role of naturalistic imagery in promoting greater environmental awareness and improved psychological well-being. Finally, the research by Sonntag-Öström, E., et al. (Sonntag-Öström et al., 2014) investigated the effect of a short stay in a national park on emotional health, highlighting a significant improvement in mood and overall well-being. This study, published in *Urban Forestry & Urban Greening*, uses empirical data to support the hypothesis that direct nature experiences can promote better mental health. The author suggests that combining the experience of *shinrin-yoku* with naturalistic drawing can amplify the overall therapeutic effect, further improving mood and positive perception of the natural environment. Additionally, a 2014 study explored the therapeutic impact of naturalistic drawing on people with chronic illnesses, finding that outdoor artistic activity can reduce symptoms of anxiety and improve quality of life. After analyzing these and other general studies on forest therapy, to identify relevant studies on the link between naturalistic drawing and well-being, we used a bibliographic search strategy with combinations of generic and specific keywords, including 'naturalistic drawing', 'well-being', 'stress reduction', 'cognitive function', 'creativity', 'connection with nature', and 'mental health'. We conducted searches in a variety of academic databases, including PubMed, PsycINFO, Web of Science, Scopus, and Google Scholar. We defined clear inclusion and exclusion criteria for selecting relevant studies. The studies had to be published in peer-reviewed scientific journals, written in multiple languages, conducted on humans, and

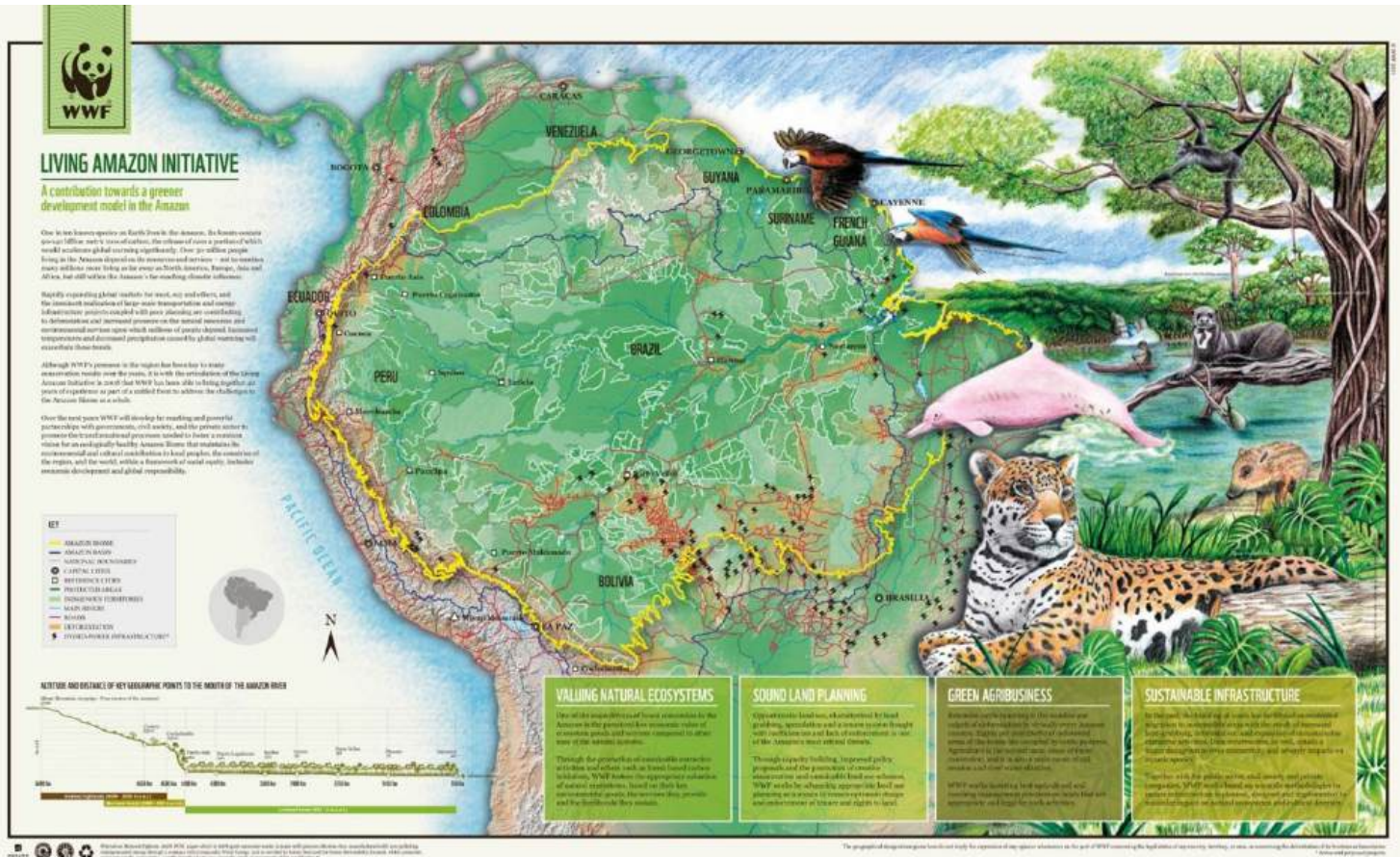
focused on the effects of naturalistic drawing on well-being. To analyze the collected literature, we used a thematic analysis approach. We carefully read each study and identified key themes related to the effects of naturalistic drawing on well-being. We then coded these themes and analyzed them to identify patterns and trends. As with any bibliographic research, this review has some limitations. First, the research was based on the studies available in the consulted databases, meaning there may be other relevant studies we did not find, and indeed we did not find any directly on the potential psychological impacts of naturalistic drawing. Despite its limitations, this literature review provides a comprehensive overview of available studies on forest therapy, allowing the extrapolation of results on the effects of naturalistic drawing on well-being. The findings suggest that naturalistic drawing can be an effective intervention for reducing stress, improving cognitive function, increasing creativity, strengthening the connection with nature, and promoting mental health. Naturalistic drawing, by combining careful observation of nature with artistic creativity, triggers a cascade of reactions in our brain. Immersion in the graphic representation of the natural world stimulates the limbic system, the brain region associated with emotions and memory, promoting the release of neurotransmitters like dopamine and serotonin, which foster sensations of pleasure and well-being. Simultaneously, the prefrontal cortex, involved in higher cognitive processes such as planning and problem-solving, is activated, improving concentration and the ability to cope with stress. Interestingly, drawing can reduce the activity of the

default mode network, the part of the brain often engaged in self-referential thoughts, thus promoting a state of greater mindfulness. This synergy of neural activations and inhibitions makes naturalistic drawing a powerful tool for reducing anxiety, improving mood, and promoting a sense of calm and well-being. The role of naturalistic drawing in art therapy is fundamental. Art therapy uses artistic expression as a tool to promote psychological well-being and address a wide range of issues, from trauma to anxiety. Naturalistic drawing, in particular, offers a gentle and non-judgmental way to explore one's emotions and thoughts, fostering non-verbal communication and self-awareness. Through the representation of nature, individuals can express aspects of themselves that might be difficult to verbalize, finding new inner resources and developing more effective coping strategies (Kaplan & Berman, 2010). Numerous scientific studies support the benefits of naturalistic drawing on mental health. Research conducted in the neurological field has demonstrated how drawing activates brain circuits associated with creativity, memory, and emotional regulation. Furthermore, clinical studies have highlighted how naturalistic drawing can reduce symptoms of anxiety and depression, improve sleep quality, and increase self-esteem. In conclusion, naturalistic drawing is a multisensory experience that involves both mind and body, promoting psychological well-being on different levels. Whether as a recreational activity or a therapeutic tool, naturalistic drawing offers everyone the opportunity to express their creativity, connect with nature, and find a sense of inner peace. The analysis of current scientific data clearly

highlights that both *shinrin-yoku* and naturalistic drawing offer significant benefits for mental and emotional health.

The analysis of existing data confirms that both *shinrin-yoku* and naturalistic drawing are effective in improving mental and emotional health through various mechanisms: stress reduction, blood pressure lowering, mood improvement, increased environmental awareness, and reduction of anxiety and depression levels. The combination of *shinrin-yoku* and naturalistic drawing creates an even deeper wellness experience. Immersing ourselves in nature while drawing allows us to: Increase immersion-the connection with nature deepens, fostering a more profound sense of peace and well-being; stimulate creativity-the beauty of nature inspires new ideas and creative solutions; enhance cognitive benefits-concentration, memory, and problem-solving improve even more; boost mental well-being: stress, anxiety, and depressive symptoms decrease, while happiness and vitality increase (Englund & Lundqvist, 2016).

Drawing, which has long served as a bridge between humans and nature, is now finding new significance in global health policies. Countries like the United Kingdom, with its Green Social Prescribing program, and the United States, with Park Rx, are promoting nature exposure as a treatment for mental health. In this context, drawing proves to be a valuable tool: a nature journal encourages careful observation (fig. 7), mandalas inspired by natural elements foster mindfulness (fig. 8), and art therapy allows for the expression of emotions evoked by nature. In Canada, PaRx, the first national ev-



idence-based nature prescription program, could integrate drawing as a tool to evaluate the benefits of natural therapies. In Japan, where *shinrin-yoku*, or ‘forest bathing’, as we’ve seen, is a well-established practice, drawing could enrich the experience, stimulating creativity and connection with the environment. Even in Finland, with the Nature Step to Health program, drawing could become a key element in engaging people in biodiversity conservation and planetary health. Drawing, beyond being a form of artistic expression, represents a powerful tool for strengthening the bond between humans and nature, promoting psychological well-being and environmental awareness.

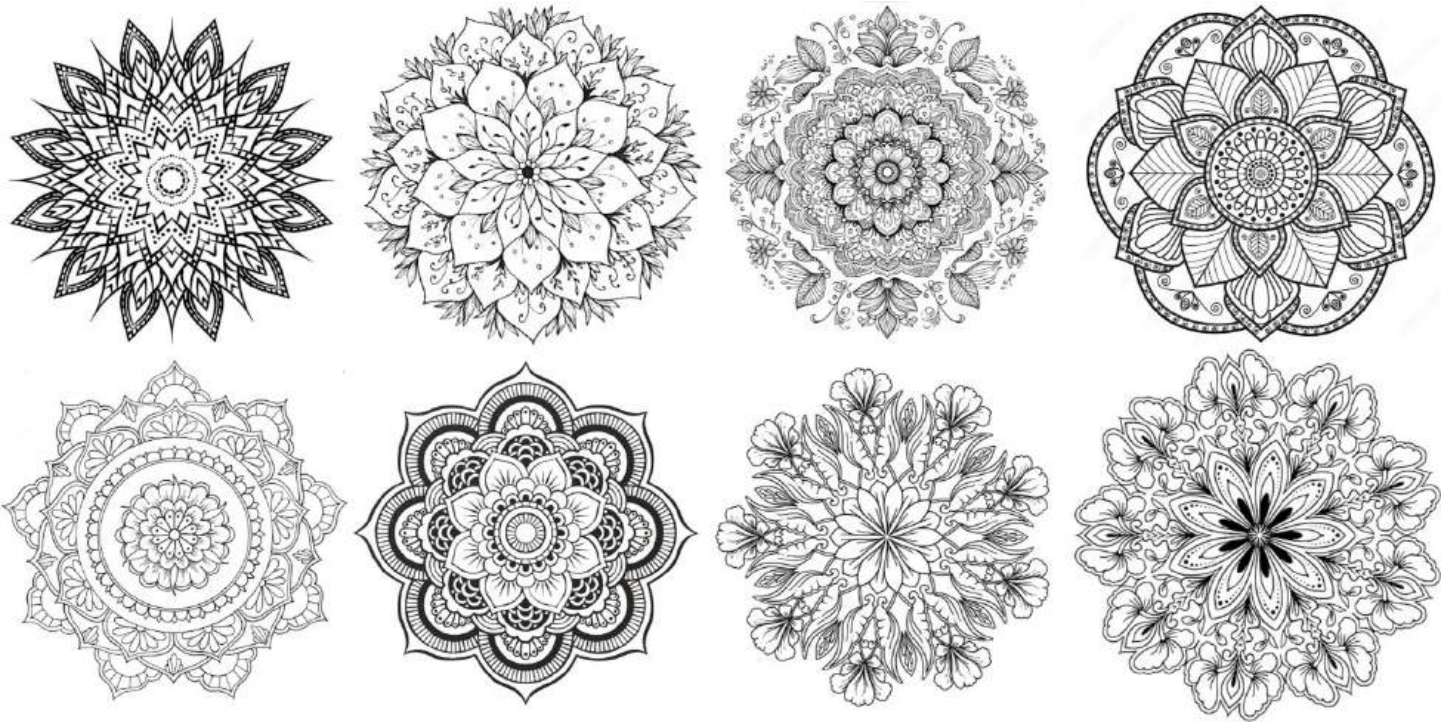
Fig. 6. Infographics created by the World Wildlife Fund (WWF).



Fig. 7. Graphic representations of the benefits of forest therapy - Architectural Representation Studio T-1 (A.A. 2022/2023), first cycle degree programme (L) in Architecture-Engineering - Alma Mater Studiorum University of Bologna.

Innovation and conclusion-exploring the synergy between Forest Immersion and Artistic Expression

This article aims to be innovative and significant by synthesizing and deepening the emerging relationship between *shinrin-yoku* and naturalistic drawing-two distinct practices that, despite their differences, share considerable therapeutic potential for enhancing individual and collective well-being. *Shinrin-yoku*,



or forest bathing, has been increasingly investigated in recent decades, and research has shown that it is associated with a wide range of physiological and psychological benefits. Hansen, Jones, and Tocchini (2017) report that immersion in forest environments can lower salivary cortisol, reduce heart rate and blood pressure, and enhance parasympathetic activity, supporting relaxation and stress reduction. Meta-analyses confirm that forest bathing significantly decreases symptoms of anxiety and depression, demonstrating its effectiveness as a nature-based intervention for mental health (Song et al., 2023; Park et al., 2009).

Furthermore, studies suggest that time spent in forests can enhance emotional regulation and self-compassion, reducing repetitive negative thinking and promoting mindfulness (Shin et al., 2024).

Fig. 8. Collections of mandalas inspired by natural elements.

Nature Based Therapy
Reconnect. Learn. Grow

Nature Based Therapy
Finding your authentic self in an unauthentic world.

VISION:
Our vision is to integrate the nature environment into the healthcare and education system to support personal development.

GUIDING PRINCIPLES:

- Work as a collective with individuals, families and communities
- Provide holistic care that incorporates the whole person
- Promote self determination and empowerment
- Creatively apply existing skills to environmental concepts
- Shift practice, theory and values to incorporate the natural environment
- Learn from spirituality and Indigenous cultures
- Incorporate the natural environment into social work education
- Appreciate the instrumental and innate value of non-human life

PROCESSES:

- Holistic Health
- Indigenous Philosophy
- Nature Based Mindfulness
- Nature Journaling
- Nature Based Diet
- Creative Arts
- Holistic Counselling
- Self Care

AFFILIATIONS:

MISSION:
Our mission is to provide a holistic approach to health and wellbeing by offering education and programs to incorporate nature-based interventions that supports the concept of person-in-environment (PIE). Our strategy is to use nature connection processes to promote self-awareness and self-reflection within a therapeutic environment. We work with embodied and sensory understandings of nature connection through observation and practical applications.

HOLISTIC HEALTH:

- Social
- Emotional
- Spiritual
- Intellectual
- Physical
- Environmental
- Financial
- Occupational

LEARNING OUTCOMES:

- To develop an awareness and improve connection to the natural world
- Apply nature based therapy techniques to current practices
- Competency in guiding the processes of nature based therapy
- To develop assessments and support plans incorporating nature based therapy
- Facilitate group therapy within nature based practices
- Development and improved knowledge of personal practice

Nature Based Therapy is a therapeutic intervention that can be implemented into any healthcare or educational setting that works with individuals, families and community groups.

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Fig. 9. A collection of images showcasing initiatives focused on drawing and depicting nature: on the left, a poster from the Children & Nature Network; on the right, an initiative organized at the Royal Free Hospital by Regent's University London.

In parallel, art therapy and creative practices, such as naturalistic drawing, have been shown to foster emotional well-being, reduce anxiety and depressive symptoms, and improve coping mechanisms (Fig. 9). Systematic reviews indicate that visual arts interventions are associated with significant improvements in mental health outcomes across diverse populations (Joschko et al., 2024; Quinn et al., 2025). Moreover, integrating creative activities with natural environments—a concept explored in nature-based art therapy—may amplify these benefits, with studies showing positive effects on anxiety, de-

pression, self-esteem, and overall psychological resilience (Jean-Berluce, 2024; *Frontiers in Psychology*, 2025).

In conclusion, this article stands out for its contribution to outlining the synergistic potential of *shinrin-yoku* and naturalistic drawing in promoting individual and collective well-being. It provides a solid theoretical and empirical foundation for further research and practical applications, advancing the field of nature-related therapeutic practices in contemporary settings.

Looking ahead, the integration of *shinrin-yoku* and naturalistic drawing offers promising avenues for both research and practice. Longitudinal studies could clarify the long-term effects of combined interventions on mental health and emotional resilience, while neurobiological investigations might reveal underlying mechanisms linking nature exposure and creative expression to physiological and psychological outcomes. Furthermore, expanding these practices to urban and clinical settings could enhance accessibility, promoting well-being in populations with limited exposure to natural environments. Finally, interdisciplinary collaborations among psychologists, artists, ecologists, and healthcare providers could foster innovative programs and tailored interventions, ultimately contributing to a more holistic approach to mental health and well-being.

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